

**FIGURE 8:** Low-frequency response: Focal 8K5412 (8") in 0.9ft<sup>3</sup> sealed box, pair on rear floor of 1994 Dodge Intrepid.

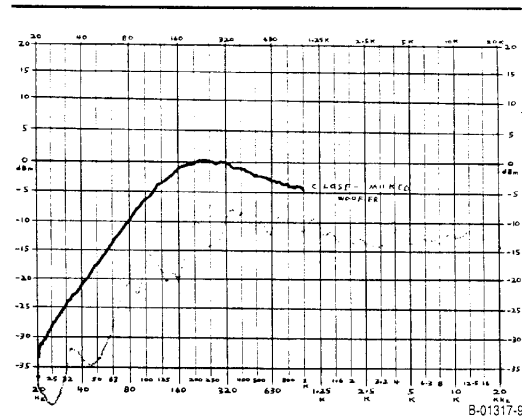
units, fasten them securely with seat belts to prevent them from flying in a panic stop. Second, if you have a conventional autosound system, don't measure its frequency response, and especially not the transient response—you'd probably want to rip it out (unless you like the sound and can ignore the measurements).

### BASS/MID CROSSOVER

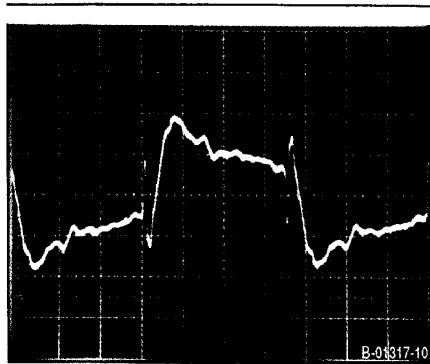
This information is for reference only, since my present system could benefit from further research in flattening the 300–400Hz shelf dip. (Fig. 5).

Figure 14 shows the CO I used: it's true first-order, noninverting. With the woofers closer to the listener than the mid/high units, the usual problem with woofer phase lag (deep CO notch) is eliminated. (The anomalies in Figs. 5–7 vary with position and distance and are not present in free-space, close-miked measurement, so are probably due to car acoustics.)

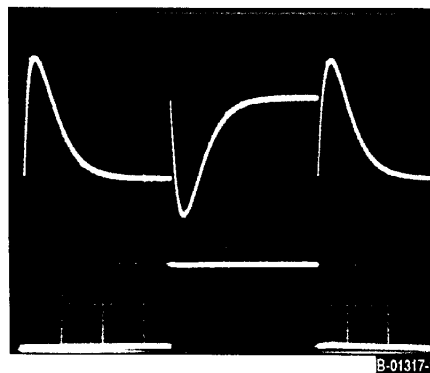
Photo 3 shows the felt I wrapped around the a/d/s/ 5"-cone rear basket to lower its



**FIGURE 9:** a/d/s/ 300C S/N 10867-2. 1m on axis, 2100ft<sup>3</sup> live room, 1/6 octave smoothing, felt damping on woofer rear; changed tweeter CO cap from 6.8μF to 17μF.



**FIGURE 10:** a/d/s/ 300Hz square-wave response.



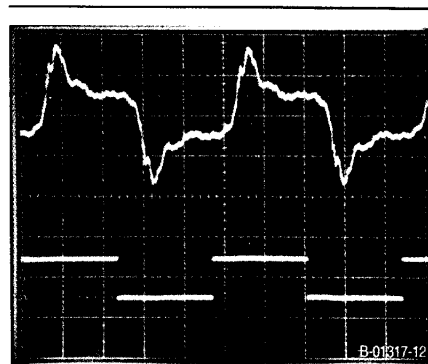
**FIGURE 11:** Ideal third-order CO square-wave response.

100Hz resonance impedance peak through mechanical damping (Fig. 15). Otherwise, the desired simple series (140μF) cap would not attenuate around 100Hz, causing a response peak and excessive excursion. I learned this the hard way: after 12 years of 50W-per-channel pounding without this damping, about 75% of the surround ripped (but the drivers still worked), so I glued them with Dynaudio's Constantly Elastic speaker glue. Now they're almost as good as new.

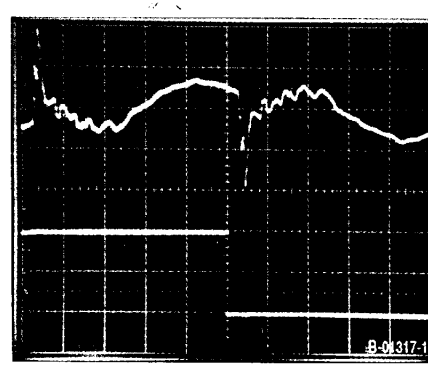
### ASSORTED COMMENTS

1. If you just desire a system that breaks bass-SPL contest records, simply install three 18" woofers in the trunk and power with 900W—some people do! But you probably won't get better-sounding bass than with a simple rear-floor, sealed-box subwoofer.

2. With such smooth, subterranean extended bass, you can add tremendous electronic boost—for loudness compensation or pleasure—without its sounding unpleasantly boomy or resonant. I must admit to using a 12dB/octave electronic rise from 60Hz down to a maximum of 18dB at 20Hz. Much music has a small but present energy



**FIGURE 12:** Focal and a/d/s/, 41Hz square-wave response.

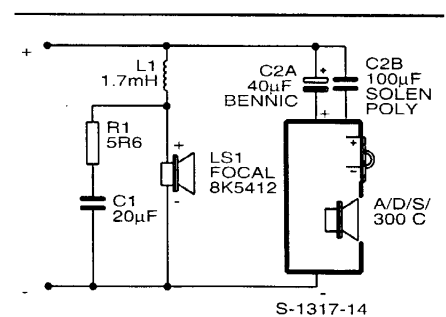


**FIGURE 13:** Focal and a/d/s/, 10Hz square-wave response.

content down to 20Hz. When you hear a response smoothly rising to +18dB at 20Hz, the effect seems to be like the raw, natural, sheer power that you hear and feel in a good live performance, where room gain often results in similar response. Even at moderate reproduced volume, you hear simply amazing bass depth, clarity, and power.

3. I chose the Focal unit because of my great satisfaction with Focal's 10" unit (10V 516J) in a home system (Photo 4), the 8K5412's smooth response (Fig. 16), and its low Q<sub>t</sub>. Note that a Focal 10" is used in the sub for the well-acclaimed Aria speaker.

With a nonphase-inverting first-order CO to the midrange, these drivers in a sealed box reproduce bass with such tonal accuracy and transient-impact solidness that the



**FIGURE 14:** Focal and a/d/s/ crossover.